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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

MAY 17 1994

MEMORANDUM

SUBJECT: Chevron Hawaii RFI

FROM: Katherine J. Baylor, Hydrogeologist
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TO: Tim Stott, Permit Writer
RCRA AZ/NV/PI Section

I have reviewed the RFI report for Chevron Hawaii Refinery dated November 1993. There are several issues which need to be addressed, both from a hydrogeology and site-wide perspective. I have outlined my concerns below, by major and minor problems.

MAJOR CONCERNS

1. SWMU 18 SWMU 18 needs further investigation. The contractor who prepared the RFI, Engineering Science Incorporated, has recommended further characterization of this SWMU, which I believe is appropriate. This SWMU, the Crude Tank Area Impoundment Basin, is divided into small, medium, and large areas (designated 18S, 18M, and 18L respectively in the RFI). The RFI states that SWMU 18 is currently being used for collection of stormwater runoff and non-hazardous liquids and solids; however, the levels of contaminants exceed the Hawaii Dept of Health soil clean-up guidelines (Table 3.21 in the RFI) for the following contaminants: benzene, ethylbenzene, naphthalene, methylnaphthalene, phenanthrene, pyrene, benzo(a)pyrene, chromium, lead, and organic lead. Some of the semi-volatile results are exceedingly high, approaching part per thousand levels in 18S and 18M. Also, 18L and 18S have organic lead ranging from 3-110 ppm. DOH clean-up guidelines specify clean-up to non-detectable levels.

The volatile organics results are likely to be low-biased, due to volatilization/biodegradation of the samples prior to analysis at the lab. In addition, most of the VOC samples had hold times of 10-13 days, which rapidly approaches the maximum 14-day hold time, and is a significant factor in the loss of soil VOCs. Numerous studies have indicated probable low bias of VOCs in soils, approaching 90% or greater loss (EPA 540/R-94/506, Measuring and Interpreting VOCs in Soils: State of the Art and Research Needs, Jan 1993) Aerial photos from 1985 show a dark substance present in all areas of SWMU 18; the analytical results presented in the RFI confirm the presence of petroleum by-

products.

SWMU 18L is considered a U.S. Fish and Wildlife habitat for an endangered stilt. Aside from the obvious chemical concerns, the stilt may be imperiled by the physical action of the petroleum by-products present in SWMU 18, due to adhesion of the material onto feathers. The presence of organic lead also suggests the possibility of bio-uptake from macroinvertebrates to the birds. Guidance from Jon Hale (U.S. Fish & Wildlife) is needed before any decision can be made about SWMU 18. The analytical results presented in the RFI indicate that it may be a candidate for some type of remediation. Although it is possible that remediation of SWMU 18 would destroy the habitat as it currently exists, the current form is not an ideal bird habitat. The area around Campbell Industrial Park has fairly high surface infiltration, so there may not be many sources of standing freshwater. Therefore, the standing water in SWMU 18 may present one of the few available habitats to the endangered stilt, although it is far from ideal. The RFI states that Chevron has provided additional data for SWMU 18L (page 4-2), but I haven't seen that data yet. Although it's true that a large number of samples would need to be collected to get good statistics, the data we already have indicates that SWMU 18 is seriously impacted by the contaminants listed above.

2. Oily sewer leak The most significant impact to groundwater is the leaking sewer in the backyard area, which has released large amounts of hydrocarbons to the shallow aquifer. Although this spill is not included in the RFI due to debate with the facility about whether or not it constitutes a Solid Waste Management Unit, you have previously identified it as a signicant groundwater pollutant, and recovery of the product layer is currently in progress. The facility should be encouraged (mandated?) to continue the product recovery effort, as well as further characterize the extent of the plume. Documentation which Chevron has provided (February 17, 1994, memo) indicates that they have delineated the plume based on product layers in the monitoring and recovery wells.

The determination of the product layer, however, appears to be based on measurements provided by an oil/water interface probe, which only detects gross levels of hydrocarbons. The o/w interface probe will not detect the plume's miscible components which may be on the leading edge of the plume. Recent data which Chevron has submitted (March 29, 1994, letter) indicates that an oily sheen was visually detected in routine groundwater sampling in wells 15 and 33, which is significantly downgradient of where Chevron has indicated the plume front. The o/w interface probe is an inadequate instrument to detect the hydrocarbon plume.

Additionally, the observation of an oily sheen is also a rather gross and subjective measure of hydrocarbons. Chevron must

further characterize the location of this plume based on gw chemistry, rather than relying on field observations. The oily sheen in wells 15 and 30 may have either the sewer spill or the oxidation ponds as its source, and, given the nature of the contaminants at this site, it may be difficult or impossible to accurately pinpoint the source. In any case, it needs to be remediated. It is possible that gw contamination from the leaking sewer has already reached the ocean. **Do we have any chemistry from the wells between Chevron's estimation of the plume and the Pacific Ocean?? (Wells 15, 33, 32, 9, R6, 31, R7, R5, R36, R4, R3, R10)**

The data submitted in the February 17 memo from Chevron failed to include information on hydrocarbon thickness in wells 35, R38, R13, R33, R34, R12, and RW1, yet the plume boundary estimate (Figure 10-HA-2217-0) indicates that hydrocarbons were detected in all these wells. I would like to see h/c thickness data for all these wells, and groundwater chemistry (Skinner list volatile and semi-volatile organics) for wells 15, 33, 32, 31, R5, R4, R3, and R10.

There is no upgradient data for the backyard h/c leak. Given that the shallow groundwater changes direction with the tide, it seems plausible that some of the h/c plume may have moved upgradient, or towards the north/northwest.

3. Background Soil Samples The locations of the two background soil samples may be inappropriate. Background (or reference) samples are intended to indicate the local, or native, concentrations of contaminants for that environment. Background samples, should, in general, be collected in non-impacted areas which are as close as possible to the site so that the soil/rock type is comparable, while avoiding areas which may have been contaminated by blowing dust, surface runoff, or previous site activities. In an industrial area such as Campbell Industrial Park, it may be difficult to collect a truly non-impacted sample, but the background sample location should not be in an area which was previously used for industrial activities which are site-related. In other words, it should be off-site and upgradient from Chevron sources of contamination (including surface runoff and air emissions).

One background sample location (BKG-1-0.5) is located in the Co-Generation Plant area, and the other background sample (BKG-2-1) is located in the "Future Tankage" area. It is not apparent from the documentation provided what the current and past activities at these locations were. A 1985 aerial photo of the site indicates that the background soil sample locations were relatively undisturbed, but the high chromium levels found in both background samples (significantly higher than DOH clean-up guidelines) create suspicion that these locations may have been impacted.

Any reference to soil contaminant levels at Chevron relative to these background locations is suspect, especially for chromium. The Hawaii DOH recommended soil clean-up level for chromium is 1 ppm. However, realistically, there are several sites at Campbell Industrial Park which could also have contributed to Cr in the soil, including a wood treatment plant 1500 feet east of BKG-2-1. Also, as a minor point, background samples, like blank and duplicate samples, should not be identified to the lab. Labelling a sample BKG-x-x clearly identifies it as a background sample.

MINOR CONCERNS

1. The map in Figure 1.2 was rotated 90° to fit the page format, without a corresponding rotation of the North directional arrow. The Pacific Ocean is west of the site.

2. No field description of the soils was included. Typically, field descriptions of soils include information about rock type, grain size, color, odor, visible staining, and presence of organic material. EPA has published a field pocket guide to description and sampling of contaminated soils (EPA/625/12-91/002) which may prove useful in future investigations.

3. The groundwater sampling adjacent to SWMU 32 (failed sump) was a non-standard technique; the grab sample collected from a shallow boring may not be representative of true groundwater quality. However, the results indicated little impact to gw. Probably doesn't warrant further investigation, especially since that sump has been replaced with a fiberglass liner.

4. The Sump Integrity Test which indicated failure of the Weak Acid Neutralization Sump needs to be examined to determine the potential failure of other sumps at the facility, especially any that are used for acid waste. Although it is true that the calcium carbonate coral will provide a buffer for weak acid solutions, the acid will also likely dissolve the coral to some extent, leading to failure of supporting walls of the sump. The insertion of an inert, corrosion-resistant liner should be considered for other sumps which are likely to fail, SWMU 33 and 34, the Strong Acid Neutralization Sump and the Alkylation Plant Neutralization Sump.

5. The 1985 aerial photo of Chevron shows two areas of beachfront with visible staining: one area west of SWMU 20, and another area due west of SWMU 21 (southwest corner of site). Have these areas ever been examined? The area west of SWMU20 looks like it may be natural, but the one west of SWMU 21 looks more suspicious. This area is coincident with a 16" diameter effluent discharge line (Figure 10-HA-1051). The 16" diameter pipe appears to be the sole stormwater discharge line for the site, and the aerial photo indicates that petroleum discharges have occured here.

This visible area of contamination is approximately 600 feet of shoreline, extending 200 feet into the Pacific Ocean. What is the integrity of the stormwater pipeline? Is runs parallel to the oily sewer; maybe the h/c layer is leaking to the stormwater pipeline. Alternatively, (and this is a nightmare scenario) the stormwater pipeline may be set in gravel, which provides an ideal conduit for transfer of contaminants and could have a much higher hydraulic conductivity than the native rock. The higher hydraulic conductivity could allow the free h/c from the backyard area to reach the ocean. This scenario is supported by the 1985 aerial photo, which shows contamination at the shorline, while the site plan indicates that the stormwater pipeline extends several hundred feet offshore. Another possibility is that the pipeline is broken where it reaches the shoreline and wastewater is discharged directly onto the beach, rather than in deeper water offshore. There are many possible explanations, but I think this warrants further investigation, but maybe not by us (more of an NPDES problem).

6. Many of the samples had matrix interference problems due to the high background levels of hydrocarbons. The matrix interference, combined with the silica gel clean-up to remove background hydrocarbons and associated sample dilution, probably resulted in an underreporting of semi-volatile organics. The matrix spike/matrix spike duplicate recoveries are very low (less than 40%), indicating a likely low bias. Another consequence of the matrix interference is the raised reporting limit. For some analytes, the reporting limit is much greater than the DOH soil clean-up guidelines.

For example, the RL for benzo(a)pyrene was 30,000 ug/kg for several samples, while the DOH soil clean-up guidelines specify 1,000 ug/kg. So, a ND (non-detect) simply means that that compound was not detected <u>above</u> the RL of 30,000 ug/kg. Any target compounds may have been diluted out; this is indicated by the fact that the surrogates were diluted out for several samples. However, the matrix interference problems are inherent to the site, and it may not be possible to acheive lower reporting limits. (some samples re-extracted and analyzed a month later w/ND. However, still high metals for SWMU 27, drum storage area.) Analysis of 1985 air photo indicates staining in the drum storage area (SWMU 27).

7. You have already stated that you believe additional soil samples are needed to characterize SWMU 22 (North Ocean Pond), due to improperly selected locations (two samples at one end of the Pond). Re-extraction and analysis of the samples from SWMU 22 indicates levels of phenanthrene (39 ppm in SWMU-22-1-0.5) almost twice as high as the Hawaii DOH soil clean-up guideline of 20 ppm. More samples, appropriately located, are needed to characterize this unit.

8. The North Surge Pond (SWMU 17) showed high levels of chromium

(19-27 ppm). The RFI report indicates that this SWMU was regraded and paved over after the soil samples were collected. May not be possible to collect more samples here. The levels are, however, below background levels, although the background locations may not have been appropriately chosen.

9. Samples collected on Friday, September 17, 1993, were received at the laboratory on Monday, September 20. In general, a 24-hour transit time is recommended for environmental samples, as they must be chilled to 4°C. It is difficult to maintain this temperature over a 72-hour transit time, especially when shipping from a hot climate such as Hawaii. In addition, the loss of volatile organics will increase with higher temperature. Even with the delayed transit time, samples from SWMU 9 (SWMU-9-1-3.5) showed levels of ethylbenzene greatly exceeding the DOH clean-up guidance (5.7 ppm found/clean-up of 1.4 ppm). Another sample from SWMU 9 also had unacceptable levels of ethylbenzene (2.8 ppm in sample SWMU-9-2-3.5). However, ES believes these levels are caused by sub-surface h/c recovery project.